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SENSOR PERFORMANCE REPORT VOL. 4 (S-190A)

FINAL REPORT

Job Order 75-215

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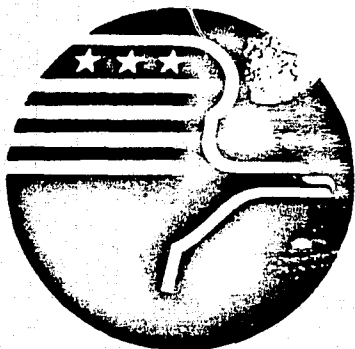
Aerospace Systems Division

Houston, Texas

Contract NAS 9-12200

for

Earth Observations Division



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

March 1975

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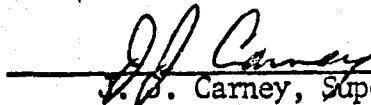


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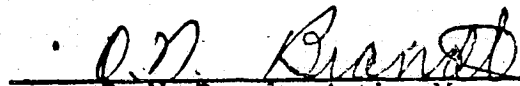
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1.0 INTRODUCTION

This report is a summary of efforts expended to determine the radiometric accuracy and signal-to-noise ratio achieved by the S190A multispectral camera. The technique used was to computer-model the photographic system and to compare theoretical results to known or measured radiometric values. To accomplish this a computer program, ARACMO, was written to handle the volume of data necessary to make a radiometric estimate (LEC-1329). The two sources used as known targets for radiometric evaluation were the film broadband sensitometry and the lunar disc. The former represents an accurate radiometric source which can be used to calculate the signal-to-noise error inherent in the photographic system without incorporating camera error; while the latter, although providing a radiometric target of lesser known accuracy, can be used to determine total camera system accuracy.

The procedure outlined above was performed for data taken during three Skylab remote sensing missions. Both the broadband and spectral sensitometry were available for most, though not all, film rolls for pre- and post-mission radiometric evaluation of sensitometry. Sensitometry was either fogged or the bandwidths were not compatible, in some cases.

Data from Lunar Calibration passes 1,2,3,4,5 were used for the lunar radiometric evaluation. Sensor inter-comparison between S190A, S191 and S192 was limited to Lunar Cal. 3 data.

Responses for S190A and S192 were computed based upon S191 data to compare the sensors' responses. The data utility (to end users) was not specifically investigated.

2.0 RADIOMETRIC ACCURACY DETERMINATION

2.1 THEORY

The radiometric accuracy portion of the S-190A sensor performance evaluation was divided into two phases based upon the radiometric source. In the first, the Kodak I-B Sensitometer was used as an irradiant; while in the second phase the radiometric source was the lunar disc. In both these cases, the spectral sensitometry and a known or assumed radiometric distribution was used to predict the film density versus energy density (ergs/cm^2) function using ARACMO. The plane of incidence of the irradiant energy is taken to be at the film plane for the sensitometric study and the window plane for the lunar calibration study. The next step was to measure film density and determine the corresponding energy density using the function generated by ARACMO. The ratio of the computed and measured values were tabulated for data based on pre- and post-mission sensitometry.

2.2 PROCEDURE

2.2.1 Radiometric Analysis of Sensitometry

In this portion of the sensor performance evaluation of S190A the stability of the films and the accuracy of a computer model to predict an exposure were investigated. The spectral sensitometry was used as an input to predict the broadband sensitometry (D log E curve). The ratios of the two values of exposure give an indication of the error generated in using spectral sensitometry to determine the irradiance of a target.

Tables 1-96 summarize the accuracy to which the D-log E curve can be predicted from the spectral sensitometry. The simulation of the D-log E curve was attempted for all rolls of film for which there was spectral

sensitometry which was not fogged. This includes all spectral sensitometry reported in JL12-502, JL12-503, and JL12-505. No simulation using the JL12-503 data for the IR camera stations 1 and 2 could be made since the bandwidths as reported were narrower than the irradiant. Whenever simulation of the D-log E curve could not be made the reason was annotated on the appropriate table.

A great deal of information is contained in tables 1-96 relating to the stability of the Skylab films and the inherent error in generating radiometric estimates using Van Krevald's law. The I-B Sensitometer used to produce the D-Log E curve in general acts as a stable irradiant source, well within 10% accuracy. It has been noted that anomalous data occurs in series and that this data can be corrected by a constant. This suggests that the I-B filter pack might not have been set up properly. This occurs for rolls 67, 68, 73, 74, 1A and 2A and in all station 5 post-mission sensitometry.

There appears to be an increase in error between the computed and measured exposures which is a function of density. The cause of this error cannot be ascertained. It might be due to an increase in grain noise with density level or a misalignment in radiometric calibration between the spectrosensitometer and the I-B. The effect of this increase in error with density can be minimized by exposing the film so that the radiometric target falls in the region of .35-1.20 ND. In this way, the error can be held under 10% and in most cases around 5%.

The data from the sensitometric analysis provided the only means available to estimate system noise. This analysis is given in section 3.0.

The objective in this phase in determining radiometric accuracy was to employ the moon as an in situ radiometric calibration source. There were two modes of implementation. In the first, the total radiance of the moon was determined; while the second, the radiance averaged over the Mare Serenitatis was used.

A different type of density was measured for each radiance. For the total lunar radiance, density was measured with a MacBeth densitometer with a 3 mm aperture. Thirty readings were averaged to produce an average moon density. Density measurements of the Mare Serenitatis were made with a Joyce Loebel recording micro-densitometer. The Mare Serenitatis is one of the most prominent lunar features. This fact was very important since the viewing and aligning system of the microdensitometer is not adequate for locating small features.

The Camera Model ARACMO was used to determine radiance as a function of density. In order to compress data and eliminate the effect of change in shutter speed and simplify calculations radiance units have been converted to log (energy density). In this way only two functions are needed for each camera station, one based on pre-mission spectral sensitometry, the other on post-mission spectral sensitometry. This data is found in Tables 97-100 for an input radiance estimate of the whole moon based of AFCRL data. The error estimates are given in Tables 101-104.

Estimates were made of the Mare Serenitatis radiance. These are given in Tables 105-108.

No attempt was made to interpolate between pre- and post-mission estimates. Since the lunar radiance is bracketed by the pre- and post-estimates, any type of interpolation would improve the accuracy. However, the thermal history of the film, being as uneven as it is, makes it difficult to specify an interpolation procedure. This problem needs to be investigated.

2.2.3 Radiometric Analysis of Ground Truth Data

Insurmountable problems were encountered in the Radiometric Analysis of Ground Truth Data. Aircraft data was not exposed and processed as initial reports had indicated. There was no spectral sensitometry available. Since this film was processed differently, the Skylab spectral sensitometry was not applicable.

3.0 SIGNAL-TO-NOISE ANALYSIS

Silver halide photo materials have well-known stability problems with respect to storage and processing. The pre- and post-mission sensitometric exposures placed on the S190A film represent an effort to provide calibration and control over silver halide photo materials.

The data given in Tables 1-96 was used to determine signal-to-noise information.

A pilot analysis on the sensitometric data contained in JL12-502, JL12-503 and JL12-505 and these tables was made with a programmable desk calculator to see if some of the discrepancies between the broadband exposures and responses synthesized with the JSC camera model ARACMO and spectral sensitometric data could be explained. Since the spectral and broadband sets contain redundant information, a measure of the usefulness of the radiometric data can be made.

Four data sets were considered, the broadband, pre- and post-missions and the information synthesized from the corresponding spectral exposures using ARACMO. The data was converted to a linear format (i.e., exposure rather than log exposure) so that standard statistical procedures would be applicable. Since the broadband and spectral measurement did not conform, the broadband exposure energy was determined by linear interpolation between neighboring density levels.

Initially, the spectral data alone was checked. A density level of 1.0 was chosen as a representative speed point well into the straightline portion of the D-Log E curve. The data was laid out in matrix fashion with rows by film roll number and columns by wavelength of the energy required to produce the specified 1.0 density. Column means and standard deviations were calculated with a three sigma addition to obtain an estimate of the residual noise and to determine

if the data were indeed normally distributed.

In normally distributed data, the probability of any point being more than three standard deviations from the mean is 0.27%. Discarding one good point in about 380 has a negligible effect on the estimates of the mean and standard deviation but is quite effective at locating anomalous data. After the column means and standard deviations were calculated the lists were checked for points outside the specified limits and outliers discarded. The process was iterated until no more points were edited. Then points exceeding $\pm$ two sigma were noted but not discarded. A summary of the findings is contained in Table 1.09. Next, the data was normalized by dividing each raw entry by the row sum and calculating means and standard deviations in the manner just described. A summary of the results may be found in Table 1.10.

The test involved computing the binomial probability of rejecting N or more points out of M trials given the probability of a single edit being 0.27%. Results of this check are given in Table 1.11. Two probability columns are given, a 5% or less, and a 1% or less likelihood of truly normal data. The unnormalized data is obviously not from a normal distribution; about ten times the expected number of points were edited out. The normalized data might possibly come from a normal distribution.

Two explanations of why the normalized data set is better behaved are possible. First of all, causal sensitivity differences between rolls is suppressed and secondarily, the data is effectively averaged in the normalizing process driving the distribution towards normality by the central limit theorem.

The normalized data sets are probably not normally distributed but at least the risk is minimal. An approximate figure for signal-to-noise in the spectro-sensitometric data can be calculated as the root average of the column means divided by the column standard deviations.

Spectrosensitometric data appears to have a two-to-three percent precision for 10 nanometer wavelength intervals scanning wavelength contributions as is done in Van Kreveld's Law should increase the precision approximately as $1/\sqrt{n}$ when n is the number of contributions. Predicted response based on Van Kreveld's Law does not meet these sanguine expectations.

Correlation was another technique explored. A basic assumption in applying calibration exposures is that while the overall radiometric response of photographic film may vary between rolls, due to storage and processing and other variables, within a roll the responses are very well correlated, i.e., the exposure level in $\text{Ergs}^{-1}\text{cm}^2$ required to produce a given density level is not a function of the physical position of the exposed path on the roll.

A second attribute of correlation is that the correlation coefficient " R " may be used to partition variance. The residual variance $S_r^2 = (1-R^2)S^2$ or residual standard deviation $S_r = S(\sqrt{1-R^2})$ may be calculated when the correlated contribution ($R + X$) is removed. Confidence limits may be placed on " R " by use of Fisher's Z distribution.

Calculations in exposure space of the correlation between broadband exposures and exposure energy synthesized from spectral data did not correlate particularly well, and the individual standard deviations were large. Table 111 summarizes the correlation between the broadband and spectral sensitivities at a density of 1.0

Because of the limited number of data points available, the R coefficients are imprecise, half of the values could be due to chance 5% of the time and only one could be expected, by chance, less than 1% of the time. The data used was from the edited sets described previously.

Next, the synthetic responses generated by ARACMO were correlated with the broadband responses with similarly disappointing results, at density levels of 0.4, 1.0 and 2.0. No reasonable pattern could be found, so it was decided to check the auto covariance of the data. Table 112 gives the auto correlation matrices for camera Stations 1 and 2 broadband data. Only the supra diagonal elements of the symmetrical matrices are shown.

These correlation matrices infer that low density levels, in the toe region of the D-Log E curve, are not repeatable from one roll of film to another to the same degree that that higher densities are. Effectively, the shape of the D-Log E curve changes in the toe region whereas the mid tones and shoulder points merely tend to shift in speed.

4.0 CONCLUSIONS AND RECOMMENDATIONS

From the analysis of the spectral sensitometric data and the comparison to broadband sensitometry, it appears feasible to attain an accuracy of 10% or better in radiometric accuracy. This however is contingent on contemporaneously exposing the target and spectral sensitometry. The importance of this is evident from the lunar radiance study. Figures 101-104 show the ratios of the calculated and assumed radiances of the moon. In general, the assumed radiances fall within the estimated radiances generated using the pre- and post-mission spectral sensitometry. The temptation is to interpolate and improve accuracy. Since any interpolation scheme would improve accuracy, more research is needed into how sensitivity shifts with time; whether or not the shift is linear with exposure or log exposure and how does thermal history influence sensitivity. If these questions are solved, it should be possible to attain an accuracy of 10%.

TABLE 1. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 01 Pre-mission Sensitometry

Density	Log Exposure (calculated) $\text{Log } E_{c2}$ Ergs/cm ²	Log Exposure (sensitometry) $\text{Log } E_{s2}$ Ergs/cm ²	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.7086	-1.697	0.012	1.028
.4	-1.5136	-1.559	-0.045	0.902
.6	-1.3072	-1.342	-0.034	0.925
.8	-1.1621	-1.179	-0.016	0.964
1.0	-1.0354	-1.072	-0.036	0.920
1.2	-0.9109	-0.957	-0.045	0.902
1.4	-0.7831	-0.835	-0.051	0.889
1.6	-0.6443	-0.706	-0.061	0.869
1.8	-0.4899	-0.562	-0.072	0.847
2.0	-0.3021	-0.0400	-0.097	0.800

TABLE 2. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 01, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.5102	-1.750	-0.239	0.577
.4	-1.3061	-1.382	-0.075	0.841
.6	-1.0698	-1.115	-0.044	0.904
.8	-0.9012	-0.957	-0.055	0.881
1.0	-0.7543	-0.815	-0.060	0.871
1.2	-0.6085	-0.678	-0.069	0.853
1.4	-0.4547	-0.555	-0.099	0.796
1.6	-0.2975	-0.410	-0.112	0.773
1.8	-0.1112	-0.250	-0.138	0.728
2.0	0.2150	-0.0375	-0.262	0.548

TABLE 3. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 02, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.9476	-1.777	0.169	1.476
.4	-1.6870	-1.621	0.066	1.164
.6	-1.4202	-1.341	0.113	1.299
.8	-1.2498	-1.169	0.081	1.205
1.0	-1.1067	-1.066	0.041	1.099
1.2	-0.9721	-0.960	0.012	1.027
1.4	-0.8350	-0.848	-0.013	0.971
1.6	-0.6929	-0.720	-0.027	0.940
1.8	-0.5373	-0.600	-0.063	0.865
2.0	-0.3611	-0.420	-0.059	0.873

TABLE 4. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 02, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.5083	-1.542	-0.033	0.927
.4	-1.2983	-1.350	-0.050	0.891
.6	-1.0856	-1.100	-0.014	0.966
.8	-0.8894	-0.938	-0.048	0.895
1.0	-0.7415	-0.803	-0.061	0.869
1.2	-0.5991	-0.676	-0.076	0.839
1.4	-0.4503	-0.548	-0.097	0.800
1.6	-0.2942	-0.402	-0.107	0.782
1.8	-0.1029	-0.233	-0.129	0.743
2.0	0.2279	-0.038	-0.275	0.531

TABLE 5. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 05, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.0946	-1.060	0.035	1.084
.4	-0.8965	-0.870	0.027	1.064
.6	-0.6607	-0.640	0.021	1.050
.8	-0.5107	-0.481	0.030	1.072
1.0	-0.3869	-0.350	0.037	1.089
1.25	-0.2362	-0.201	0.035	1.084
1.5	-0.0762	-0.056	0.020	1.047
1.75	0.0892	0.091	0.002	1.005
2.0	0.2519	0.240	-0.012	0.973
2.25	0.4170	0.410	-0.007	0.984

TABLE 6. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 05, Post-mission Sensitometry

Density	Log Exposure (calculated) $\text{Log } E_{c2}$ Ergs/cm ²	Log Exposure (sensitometry) $\text{Log } E_{s2}$ Ergs/cm ²	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.2608	-1.220	0.041	1.099
.4	-1.0325	-1.019	0.014	1.033
.6	-0.8022	-0.773	0.029	1.069
.8	-0.6455	-0.619	0.030	1.072
1.0	-0.5125	-0.483	0.030	1.072
1.25	-0.3562	-0.312	0.044	1.107
1.5	-0.1975	-0.157	0.041	1.099
1.75	-0.0378	-0.012	0.026	1.062
2.0	0.1254	0.156	0.031	1.074
2.25	0.3048	0.345	0.044	1.096

TABLE 7. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 06, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.075	-1.004	0.071	1.178
.4	-0.874	-0.846	0.028	1.067
.6	-0.647	-0.644	0.003	1.006
.8	-0.500	-0.498	0.002	1.004
1.0	-0.380	-0.376	0.004	1.009
1.25	-0.234	-0.228	0.005	1.012
1.5	-0.078	-0.090	-0.012	0.973
1.75	0.088	0.064	-0.024	0.946
2.0	0.249	0.212	-0.037	0.918
2.25	0.413	0.380	-0.033	0.927

TABLE 8. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 06, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log $E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.271	-1.271	0.054	1.132
.4	-1.058	-1.026	0.031	1.075
.6	-0.832	-0.800	0.032	1.076
.8	-0.672	-0.647	0.025	1.060
1.0	-0.533	-0.517	0.016	1.038
1.25	-0.375	-0.364	0.011	1.025
1.5	-0.224	-0.215	0.009	1.021
1.75	-0.061	-0.058	0.003	1.008
2.0	0.103	0.102	-0.001	0.998
2.25	0.278	0.268	-0.011	0.976

TABLE 9. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 07, Post-mission Sensitometry

Density	Log Exposure (calculated)	Log Exposure (sensitometry)	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
	Log E_c Ergs/cm ²	Log E_s Ergs/cm ²		
.3	-1.5865	-1.6167	-.0302	.9328
.4	-1.2778	-1.2700	.0078	1.018
.5	-1.1152	-1.1000	.0152	1.0365
.6	-.9913	-.9600	.0313	1.0747
.8	-.7981	-.4482	.0199	1.0469
1.0	-.6380	-.6382	-.0002	.9995
1.2	-.4845	-.4900	-.0055	.9874
1.4	-.3206	-.3310	-.0104	.9763
1.6	-.1292	-.1622	-.0330	.9268
1.8	.6405	.0300	-.6105	.2452

TABLE 10. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 08, Post-mission Sensitometry

Density	Log Exposure (calculated) $\text{Log } E_c$ Ergs/cm ²	Log Exposure (sensitometry) $\text{Log } E_{s_2}$ Ergs/cm ²	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.4738	-1.5100	-.0362	.9200
.4	-1.1200	-1.2220	-.0223	.9499
.6	-.9494	-.9538	-.0044	.9899
.8	-.7768	-.7556	.0212	1.0500
1.0	-.6494	-.6200	.0294	1.0700
1.2	-.4335	-.4827	.0492	1.1199
1.4	-.2704	-.3311	.0607	1.1500
1.6	-.2357	-.1565	.0792	1.2003
1.8	-.0333	.0636	.0969	1.2499
2.0	.2225	.3364	.1139	1.2998

TABLE 11. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 11, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.6	-.8538	-.7765	.0773	1.1948
.8	-.6688	-.6080	.0608	1.1503
1.0	-.5111	-.4582	.0528	1.1293
1.25	-.3240	-.2813	.0427	1.1033
1.5	-.1304	-.1464	-.0160	.9638
1.75	.0731	.0700	-.0031	.9929
2.0	.2929	.2800	-.0129	.9707
2.25	.5400			

TABLE 12. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 12, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.3303	-1.1971	.1332	1.3590
.4	-1.0617	-1.0054	.0563	1.1384
.6	- .8109	- .7713	.0396	1.0954
.8	- .6278	- .5824	.0454	1.1102
1.0	- .4661	- .4300	.0361	1.0867
1.25	- .2791	- .2491	.0300	1.0715
1.50	- .0871	- .0759	.0112	1.0261
1.75	.1228	.1040	-.0188	.9576
2.0	.3477	.3095	-.0382	.9158
2.25	.5936	.5329	-.0610	.8690

TABLE 13 - COMPARISON OF EXPOSURE GENERATED BY
VAN KREVALD'S LAW AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 13 Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E _c Ergs/cm ²	Log Exposure (sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.3	-1.7086	-1.697	0.012	1.028
.4	-1.5136	-1.559	-0.045	0.902
.6	-1.3072	-1.342	-0.034	0.925
.8	-1.1621	-1.179	-0.016	0.964
1.0	-1.0354	-1.072	-0.36	0.920
1.2	-0.9109	-0.957	-0.045	0.902
1.4	-0.4831	-0.835	-0.051	0.889
1.6	-0.6443	-0.562	-0.072	0.847
2.0	-0.3021	-0.0400	-0.097	0.800

TABLE 14. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 17, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.4	-1.3957	-1.0286	.3671	2.3286
.6	-1.0711	-.8100	.2611	1.8243
.8	-.9195	-.6320	.2875	1.9387
1.0	-.7896	-.4800	.3090	2.0370
1.25	-.6213	-.3067	.3146	2.0635
1.50	-.4398	-.1257	.3141	2.0611
1.75	-.2645	.0624	.3269	2.1228
2.0	-.0775	.2741	.3516	2.2470
2.25	.1483	.5187	.3704	2.3464

TABLE 15. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022
Roll: 18, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3				
.4	-1.4591	-1.0055	.4536	2.8418
.6	-1.1729	- .4413	.4016	2.5212
.8	- .9960	- .6060	.3900	2.4547
1.0	- .8501	- .4591	.3910	2.4604
1.25	- .6763	- .2839	.3924	2.4683
1.50	- .4970	- .0895	.4075	2.5556
1.75	- .3153	.0880	.4033	2.5310
2.00	- .1230	.2978	.4208	2.6351
2.25	.1122	.5214	.4092	2.5657

TABLE 16. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 20, Pre-mission Sensitometry

Density	Log Exposure* (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.4		-1.440		
.6		-1.1400		
.8		-1.1329		
1.0		- .9904		
1.2		- .8850		
1.4		- .7850		
1.6		- .6756		
1.8		- .5504		
2.0		- .4017		

*No estimate of E_c possible since bandwidth of spectral sensitometry
(740-910nm) as reported in SL12-501 is narrower than irradiant (200-910nm).

TABLE 17. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 23, Pre-mission Sensitometry

Density	Log Exposure (calculated) $\text{Log } E_{c2}$ Ergs/cm ²	Log Exposure (sensitometry) $\text{Log } E_{s2}$ Ergs/cm ²	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.0568	-1.0200	.0368	1.0884
.4	-.8730	-.8457	.0273	1.0649
.6	-.6531	-.6442	.0089	1.0207
.8	-.4944	-.4985	-.0041	.9906
1.0	-.3606	-.3763	-.0157	.9645
1.2	-.2395	-.2578	-.0183	.9594
1.4	-.1219	-.1419	-.0200	.9550
1.6	-.0031	-.0223	-.0192	.9432
1.8	.1174	.1020	-.0154	.9652
2.0	.2615	.2300	-.0315	.9300

TABLE 18. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 23, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.3092	-1.3040	.0052	1.0120
.4	-1.0631	-1.0900	-.0331	.9399
.6	-.8384	-.8641	-.0257	.9425
.8	-.6806	-.6973	-.0167	.9742
1.0	-.5431	-.5643	-.0212	.9524
1.4	-.2933	-.3315	-.0382	.9158
1.6	-.1645	-.2120	-.0475	.8964
1.8	-.1421	-.0888	-.0533	.8873
2.0	.0937	.0429	-.0508	.8890

TABLE 19. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 24, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.0205	-.9529	.0676	1.1684
.4	-.8533	-.8115	.0418	1.1010
.6	-.6395	-.7167	.0228	1.0539
.8	-.4798	-.4717	.0081	1.0188
1.0	-.3437	-.3404	.0033	1.0076
1.2	-.2167	-.2167	.0000	1.0000
1.4	-.0910	-.1162	-.0252	.9436
1.6	.0369	-.0004	-.0373	.8578

TABLE 20. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 24, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.2616	-1.2200	-.0416	1.1005
.4	-1.0603	-1.0190	-.0413	1.0998
.6	-.8450	-.7729	.0721	1.1806
.8	-.6795	-.6060	.0735	1.1844
1.0	-.5285	-.4648	.0637	1.1580
1.2	-.3878	-.3411	.0567	1.1395
1.4	-.2556	-.2226	.0330	1.0789
1.6	-.1261	-.1042	.0219	1.0517
1.8	.0074	.0112	.0038	1.0088
2.0	.1526	.1861	.0335	1.0802

TABLE 21. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 25, Pre-mission Sensitometry

Density	Log Exposure* (calculated) Log E _c ² Ergs/cm ²	Log Exposure (sensitometry) Log E _s ² Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.4		-1.7733		
.6		-1.5040		
.8		-1.3627		
1.0		-1.2560		
1.2		-1.1577		
1.4		-1.0027		
1.6		- .8340		
1.8		- .7048		
2.0				

*No estimate of E_s possible since spectral-sensitometry bandwidth as given in JL12-503 (670-880nm) was narrower than irradiand bandwidth (700-1000nm).

TABLE 22. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 25, Post-mission Sensitometry

Density	Log Exposure* (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.4		-2.0900		
.5		-1.8800		
.6		-1.3015		
.8		-1.0830		
1.0		- .9439		
1.2		- .8100		
1.4		- .6745		
1.6		- .5432		
1.8		- .4047		
2.0		- .2186		

*No estimate of E_c possible since spectral sensitometry bandwidth as given in JL12-503 (670-880nm) was narrower than irradiant bandwidth (700-1000nm).

TABLE 23. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 26, Pre-mission Sensitometry

Density	Log Exposure* (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.4		-1.800		
.6		-1.5095		
.8		-1.3600		
1.0		-1.2457		
1.2		-1.1630		
1.4		-1.0781		
1.6		- .9596		
1.8		- .7250		
2.0		- .5600		

*No estimate of E_c possible since spectral sensitometry bandwidth as given in JL12-503 (740-910nm) was narrower than irradiant bandwidth (700-910nm).

TABLE 24. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 26, Post-mission Sensitometry

Density	Log Exposure* (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.5		-1.4220		
.6		-1.2800		
.8		-1.0900		
1.0		- .9376		
1.2		- .7764		
1.4		- .6860		
1.6		- .5600		
1.8		- .4205		
2.0		- .2414		

*No estimate of E_c possible since spectral sensitometry bandwidth as given in JL12-503 (740-910nm) was narrower than irradiant bandwidth (700-910nm).

TABLE 25. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 29, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.0880	-1.0400	.0480	1.1169
.4	-.8775	-.8554	.0221	1.0522
.6	-.6569	-.6480	.0089	1.0207
.8	-.5018	-.5000	.0018	1.0042
1.0	-.3791	-.3714	.0077	1.0179
1.2	-.2419	-.2571	-.0152	.9656
1.4	-.1206	-.1419	-.0213	.9521
1.6	.0010	-.0248	-.0258	.9423
1.8	.1275	.0956	-.0319	.9291
2.0	.2662	.2236	-.0326	.9060

TABLE 26. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 29, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c^2 Ergs/cm ²	Log Exposure (sensitometry) Log E_s^2 Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.4	-1.0983	-1.0900	.0083	1.0193
.5	- .9621	- .9563	.0058	1.0125
.6	- .8597	- .9589	.0008	1.0018
.8	- .6948	- .6973	-.0025	.9943
1.0	- .5550	- .5625	-.0075	.9829
1.2	- .4255	- .4488	-.0233	.9478
1.4	- .3001	- .3300	-.0299	.9335
1.6	- .1751	- .2150	-.0399	.9122
1.8	- .0502	- .0933	-.0431	.9055
2.0	.0846	.0429	-.0417	.9084

TABLE 27. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 30, Pre-mission Sensitometry

Density	Log Exposure (calculated) $\text{Log } E_c$ Ergs/cm^2	Log Exposure (sensitometry) $\text{Log } E_s$ Ergs/cm^2	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm^2	Exposure Ratio E_s/E_c
.3	-1.0970	-1.0386	.0584	1.1439
.4	-.8939	-.8518	.0421	1.1036
.6	-.6604	-.6276	.0328	1.0804
.8	-.4914	-.4787	.0127	1.0316
1.0	-.3518	-.3433	.0085	1.0216
1.2	-.2241	-.2167	.0074	1.0190
1.4	-.0987	-.0985	.0002	1.0023
1.6	.0300	.0169	-.0131	.9721
1.8	.1529	.1348	-.0181	.9609
2.0	.3137	.2655	-.0482	.8964

TABLE 28. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 30, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log $E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.3308	-1.2200	.1108	1.2906
.4	-1.1089	-1.0000	.1089	1.2850
.6	- .8668	- .7607	.1061	1.2767
.8	- .6942	- .5900	.1042	1.2711
1.0	- .5422	- .4567	.0855	1.2176
1.2	- .4033	- .3315	.0718	1.1798
1.4	- .2732	- .2107	.0625	1.1548
1.6	- .1455	- .0920	.0535	1.1311
1.8	- .0127	.0280	.0407	1.0982
2.0	.1348	.1652	.0304	1.0725

TABLE 29. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 31, Post-mission Sensitometry

Density	Log Exposure* (calculated) Log E _c ² Ergs/cm ²	Log Exposure (sensitometry) Log E _s ² Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.4		-1.8571		
.6		-1.5533		
.8		-1.4133		
1.0		-1.3177		
1.2		-1.222		
1.4		-1.1020		
1.6		- .8468		
1.8		- .7155		
2.0		- .5600		

*No estimate of E_c possible since spectral sensitometry bandwidth as given in JL12-503 (670-880nm) than irradiant bandwidth (700-1000nm).

TABLE 30. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 32, Pre-mission Sensitometry

Density	Log Exposure* (calculated) $\text{Log } E_c$ Ergs/cm^2	Log Exposure (sensitometry) $\text{Log } E_s$ Ergs/cm^2	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm^2	Exposure Ratio E_s/E_c
.4		-1.8000		
.6		-1.4700		
.8		-1.3055		
1.0		-1.1811		
1.2		-1.0691		
1.4		- .9999		
1.6		- .8604		
1.8		- .7175		
2.0		- .5611		

*No estimate of E_c possible since spectral sensitometry bandwidth as given in JLL2-503 was narrower than irradiant bandwidth (200-910nm).

TABLE 31. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 32, Post-mission Sensitometry

Density	Log Exposure* (calculated) Log E _c ² Ergs/cm ²	Log Exposure (sensitometry) Log E _s ² Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.3				
.4				
.5				
.6		-1.3467		
.8		-1.1275		
1.0		- .9787		
1.2		- .8396		
1.4		- .7018		
1.6		- .5708		
1.8		- .4433		
2.0		- .2643		

*No estimate, E_c, possible since bandwidth of spectral sensitometry (740-910nm) as reported in JL12-503 is narrower than irradiant bandwidth (700-910nm).

TABLE 32.. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 35, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E _c Ergs/cm ²	Log Exposure (sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.3	-1.1270	-1.1275	-.0005	.9988
.4	-.9084	-.8900	.0184	1.0433
.6	-.6763	-.7167	-.0404	.9112
.8	-.5161	-.5700	-.0539	.8833
1.0	-.3834	-.4386	-.0551	.8808
1.2	-.2627	-.3243	-.0616	.8677
1.4	-.1449	-.2122	-.0673	.8564
1.6	-.0280	-.1057	-.0777	.8362
1.8	.0944	.01429	-.0801	.8316
2.0	.2283	.1467	-.0816	.8287

TABLE 33. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 35, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c^2 Ergs/cm ²	Log Exposure (sensitometry) Log E_s^2 Ergs/cm ²	Log $E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s/E_c
.4	-1.1233	-1.1233	.0000	1.0000
.5	- .9841	- .9833	.0008	1.0018
.6	- .8818	- .8767	.0051	1.0118
.8	- .7163	- .7188	-.0025	.9943
1.0	- .5764	- .5922	-.0158	.9643
1.2	- .4488	- .4737	-.0249	.9443
1.4	- .3274	- .3552	-.0278	.9380
1.6	- .2069	- .2400	-.0331	.9266
1.8	- .0859	- .1272	-.0413	.9093
2.0	.0439	.0008	-.0431	.9055

TABLE 34. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 36, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.1345	-1.0600	.0745	1.1871
.4	- .9201	- .8700	.0501	1.1223
.6	- .6875	- .6871	.0004	1.0001
.8	- .5183	- .4955	.0228	1.0539
1.0	- .3773	- .3623	.0150	1.0351
1.2	- .2496	- .2392	.0104	1.0242
1.4	- .1257	- .1162	.0095	1.0221
1.6	.0001	- .0004	-.0005	.9988
1.8	.1323	.1200	-.0123	.9721
2.0	.2762	.2509	-.0253	.9434

TABLE 35. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 36, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.1251	-1.2540	-.1289	.7432
.4	-.9867	-1.0300	-.0433	.9051
.6	-.8822	-.7900	.0922	1.2365
.8	-.4094	-.6220	.0874	1.2229
1.0	-.5571	-.4787	.0784	1.1978
1.2	-.4178	-.3500	.0678	1.1690
1.4	-.2877	-.2300	.0577	1.1421
1.6	-.1610	-.1157	.0453	1.1099
1.8	-.0312	-.0004	.0308	1.0735
2.0	.1103	.0590	-.0513	.8886

TABLE 36. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 37, Pre-mission Sensitometry

Density	Log Exposure* (calculated) Log E _c ² Ergs/cm ²	Log Exposure (sensitometry) Log E _s ² Ergs/cm ²	Log E _s - Log E _c	Exposure Ratio E _s /E _c
.3				
.4		-1.8267		
.5		-1.5920		
.6		-1.4800		
.8		-1.3127		
1.0		-1.1883		
1.2		-1.0852		
1.4		- .9882		
1.6		- .8859		
1.8		- .7755		
2.0		- .6461		

*No estimate of E_c possible since bandwidth of spectral sensitometry (700-880nm)
as reported in JLL2-503 was narrower than bandwidth of irradiant (700-910nm).

TABLE 37. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 38, Post-mission Sensitometry

Density	Log Exposure* (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3		-2.0400		
.4		-1.4960		
.6		-1.3138		
.8		-1.1233		
1.0		- .9736		
1.2		- .8367		
1.4		- .7123		
1.6		- .5909		
1.8		- .4450		
2.0		- .2887		

*No estimate of E_s possible since bandwidth of spectral sensitometry (740-910nm)
as reported in JLL2-503 is narrower than irradiant bandwidth (700-910nm).

TABLE 38. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 41, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-.9749	-1.0700	-.0951	.9014
.4	-.8169	-.8957	-.0788	.9358
.6	-.6162	-.6980	-.0818	.9293
.8	-.4686	-.5524	-.0838	.9251
1.0	-.3441	-.4263	-.0822	.9285
1.2	-.2258	-.3078	-.0820	.9290
1.4	-.1085	-.1844	-.0759	.9422
1.6	.0129	-.0848	-.0917	.8960
1.8	.1413	.0264	-.1149	.8611
2.0	.2810	.1544	-.1266	.8383

TABLE 39 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 41, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.2368	-1.2720	-.0352	.9221
.4	-1.0509	-1.0500	.0009	1.0021
.6	.8382	-.8600	-.0218	.9510
.8	-.6772	-.6935	-.0163	.9632
1.0	-.5369	-.5659	-.0290	.9354
1.2	-.4087	-.4555	-.0468	.8978
1.4	-.2860	-.3331	-.0471	.8972
1.6	-.1628	-.2178	-.0550	.8810
1.8	-.0364	-.1016	-.0652	.8606
2.0	.1043	.0280	-.0763	.8389

TABLE 40. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 42, Pre-mission Sensitometry

Density	Log Exposure (calculated) Log E_{c2} Ergs/cm ²	Log Exposure (sensitometry) Log E_{s2} Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.0027	-.9663	.0364	1.0874
.4	-.8458	-.8433	.0025	1.0058
.6	-.6351	-.6276	.0075	1.0174
.8	-.4707	-.4787	-.0080	.9817
1.0	-.3311	-.3468	-.0157	.9645
1.2	-.2035	-.2226	-.0191	.9570
1.4	-.0786	-.1035	-.0249	.9443
1.6	.0501	.0270	-.0231	.9482
1.8	.1873	.1393	-.0480	.8954
2.0	.3389	.2655	-.0734	.8445

TABLE 41. COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 42, Post-mission Sensitometry

Density	Log Exposure (calculated) Log E_c Ergs/cm ²	Log Exposure (sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.2247	-1.1971	.0276	1.0656
.4	-1.0335	-1.0000	.0335	1.0802
.6	-.8174	-.7782	.0392	1.0945
.8	-.6580	-.5989	.0591	1.1458
1.0	-.5158	-.4633	.0525	1.1285
1.2	-.3806	-.3377	.0429	1.1038
1.4	-.2492	-.2167	.0325	1.0777
1.6	-.1191	-.0975	.0216	1.0510
1.8	.0154	.0275	.0121	1.0283
2.0	.1637	.1600	-.0037	.9915

TABLE 42 COMPARISON OF EXPOSURE GENERATED BY
VAN KREVALD'S LAW AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 43, Post-Mission Sensitometry

Density	Log Exposure* (Calculated) Log E_c Log ₁₀ Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Log ₁₀ Ergs/cm ²	Log E_s - Log E_c Log ₁₀ ergs/cm ²	Exposure Ratio E_s / E_c
.4				
.5		-1.1489		
.6		-1.3333		
.8		-1.1317		
1.0		-.9809		
1.2		-.8433		
1.4		-.7138		
1.6		-.5852		
1.8		-.4433		
2.0		-.2643		

* No estimate of E_c possible since bandwidth of the spectral sensitometry (700-880 nm) as reported in JL12-503 is narrower than irradiance bandwidth (700-900 nm).

TABLE 43 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424

Roll: 44, Pre-Mission Sensitometry

Density	Log Exposure* (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.4		-1.8000		
.5		-1.6267		
.6		-1.5179		
.8		-1.3680		
1.0		-1.2613		
1.2		-1.1785		
1.4		-1.1015		
1.6		- .9714		
1.8		- .6989		
2.0		- .5311		

* No estimate of E_c possible since bandwidth of spectral sensitometry (740-910 nm) as reported in JL12-503 is narrower than irradiant bandwidth (700-910 nm)

TABLE 44 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: 2424
Roll: 44, Post-Mission Sensitometry

Density	Log Exposure* (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.4		--		
.5		-1.4457		
.6		-1.3015		
.8		-1.0993		
1.0		- .9452		
1.2		- .8148		
1.4		- .6920		
1.6		- .5643		
1.8		- .4183		
2.0		- .2300		

*No estimate of E_c possible since bandwidth of spectral sensitometry (740-910 nm) as reported in JL12-503 is narrower than irradiant bandwidth (700-910 nm)

TABLE 45 - COMPARISON OF EXPOSURE GENERATED BY
VAN KREVALD'S LAW AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 47, Pre-Mission Sensitometry

Density	Log Exposure (calculated)	Log Exposure (Sensitometry)	Log $E_s - \text{Log } E_c$	Exposure Ratio
	Log E_c Log Ergs/cm ²	Log E_s Log Ergs/cm ²	Log Ergs/cm ²	E_s/E_c
.3	-1.0368	-1.0495	.0468	1.0884
.4	-.8567	-.8267	.0300	1.0715
.6	-.6452	-.6327	.0225	1.0292
.8	-.4928	-.4933	-.0005	.9988
1.0	-.3630	-.3644	-.0014	.9967
1.2	-.2404	-.2459	-.0055	.9874
1.4	-.1202	-.1267	-.0065	.9851
1.6	.0030	-.0130	-.0160	.9638
1.8	.1321	.1085	-.0237	.9469
2.0	.1904	.2371	.0469	1.1135

TABLE 46 - COMPARISON OF EXPOSURE GENERATED BY
VAN KREVALD'S LAW AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 47, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Log Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Log Ergs/cm ²	Log E_s - Log E_c Log Ergs/cm ²	Exposure Ratio E_s / E_c
.3	-1.2980	-1.2720	.0260	1.0617
.4	-1.1241	-1.0767	.0474	1.1153
.6	-.8878	-.8500	.0378	1.0909
.8	-.7193	-.6900	.0293	1.0698
1.0	-.5774	-.5586	.0188	1.0442
1.2	-.4474	-.4438	.0036	1.0083
1.4	-.3220	-.3300	-.0080	.9817
1.6	-.1960	-.1971	-.0011	.9975
1.8	-.0663	-.0738	-.0075	.9829
2.0	.0763	.0453	-.0310	.9340

TABLE 47 - COMPARISON OF EXPOSURE GENERATED BY
VAN KREVALD'S LAW AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 48, Pre-Mission Sensitometry

Density	Log Exposure (calculated) Log E_c Log Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Log Ergs/cm ²	Log E_s - Log E_c Log Ergs/cm ²	Exposure Ratio E_s / E_c
.3	-1.0485	-1.0100	.0385	1.0927
.4	-.8638	-.8300	.0338	1.0809
.6	-.6413	-.6182	.0231	1.0546
.8	-.4801	-.4663	.0138	1.0323
1.0	-.3422	-.3377	.0045	1.0104
1.2	-.2135	-.2146	-.0011	.9975
1.4	-.0862	-.0920	-.0058	.9867
1.6	.0438	.0280	-.0158	.9643
1.8	.1803	.1508	-.0295	.9343
2.0	.3296	.2914	-.0328	.9158

TABLE 48 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 48, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.3	-1.2789	-1.1971	.0818	1.2073
.4	-1.0679	-1.0000	.0679	1.1692
.6	-.8479	-.7700	.0779	1.1965
.8	-.6794	-.5984	.0810	1.2050
1.0	-.5257	-.4578	.0679	1.1692
1.2	-.3855	-.3315	.0540	1.1324
1.4	-.2550	-.2085	.0465	1.1130
1.6	-.1271	-.0878	.0393	1.0947
1.8	.0073	.0135	.0062	1.0144
2.0	.1586	.1760	.0174	1.0409

TABLE 49

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 55, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.6	-1.4625	-1.4467	.0158	1.037
.7	-1.3545	-1.3400	.0148	1.034
.8	-1.2734	-1.2760	-.0026	.994
.9	-1.2045	-1.2120	-.0075	.983
1.0	-1.1419	-1.1443	-.0024	.994
1.2	-1.0248	-1.0087	.0161	1.038
1.4	-.9086	-.9020	.0066	1.0153
1.6	-.7847	-.7900	-.0053	.988
1.8	-.6396	-.6691	-.0295	.934
2.0	-.4649	-.5244	-.0595	.948

TABLE 50

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 55, Post-Mission Sensitometry

Density	Log Exposure (Calculated) $\text{Log } E_c$ Ergs/cm^2	Log Exposure (Sensitometry) $\text{Log } E_s$ Ergs/cm^2	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm^2	Exposure Ratio E_s / E_c
.5	-1.4077	-1.3933	.0144	1.034
.6	-1.2042	-1.1675	.0367	1.088
.7	-1.0665	-1.0425	.0240	1.057
.8	-.9561	-.9500	.0061	1.014
1.0	-.7779	-.7862	-.0083	.985
1.2	-.6332	-.6523	-.0191	.957
1.4	-.4976	-.5333	-.0357	.921
1.6	-.3522	-.4000	-.0478	.896
1.8	-.1955	-.2636	-.0681	.855
2.0	.0295	-.0900	-.1195	.759

TABLE 51

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 56, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.6	-1.4382	-1.4429	-.0047	.9892
.7	-1.3318	-1.3320	-.0002	.9995
.8	-1.2499	-1.2520	-.0021	.9952
.9	-1.1795	-1.1740	.0055	1.0127
1.0	-1.1154	-1.1140	.0014	1.0032
1.2	-.9965	-.9957	.0008	1.0018
1.4	-.8781	-.8814	-.0033	.9924
1.6	-.7549	-.7633	-.0084	.9808
1.8	-.6156	-.6413	-.0257	.9425
2.0	-.4470	-.4977	-.0507	.8898

TABLE 52

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 56, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s / E _c
.5	-1.3390	-1.4040	-.0650	.8610
.6	-1.1647	-1.1978	-.0331	.9266
.7	-1.0341	-1.0573	-.0232	.9480
.8	-.9248	-.9626	-.0378	.9166
1.0	-.7470	-.8074	-.0604	.8702
1.2	-.5989	-.6754	-.0765	.8385
1.4	-.4575	-.5600	-.1025	.7898
1.6	-.3043	-.4320	-.1277	.7452
1.8	-.1371	-.2875	-.1504	.7073
2.0	.3289	-.1088		

TABLE 53

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: So-022

Roll: 59, Pre Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-.8585	-.8433	.0152	1.0356
.6	-.6402	-.6258	.0144	1.0337
.8	-.4789	-.4796	-.0006	.9986
1.0	-.3485	-.3557	-.0072	.9836
1.3	-.1730	-.1755	-.0025	.9943
1.7	.0669	.0634	.0035	1.0081
2.0	.2710	.2580	.0130	1.0304
2.3	.5085	.4611	.0474	1.1153
2.6	.8360	.7600	.0760	1.1912
2.9	1.2868	1.16	.1268	1.3391

TABLE 54

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: So-002

Roll: 59, Post-Mission Sensitometry

Density	Log Exposure (Calculated) $\text{Log } E_c^2$ Ergs/cm ²	Log Exposure (Sensitometry) $\text{Log } E_s^2$ Ergs/cm ²	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-1.1308	-1.0167	.1141	1.3005
.6	-.8890	-.7853	.1037	1.2697
.8	-.7084	-.6227	.0857	1.2181
1.0	-.5599	-.4885	.0714	1.1787
1.3	-.3709	-.3038	.0671	1.1671
1.7	-.1184	-.0800	.0384	1.0924
2.0	+.0930	.1018	.0088	1.0205
2.3	.3623	.3268	-.0355	.9215
2.6	.6764	.6375	-.0389	.9143
2.9	1.2013	1.1038	-.0975	.7989

TABLE 55

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 60, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s / E _c
.4	-.7581	-.8467	-.0886	.8154
.6	-.5370	-.6120	-.0750	.8414
.8	-.3740	-.4564	-.0824	.8272
1.0	-.2356	-.3277	-.0921	.8089
1.3	-.0454	-.1384	-.0930	.8072
1.7	.2081	.1177	-.0904	.8121
2.0	.4241	.3100	-.1141	.7690
2.3	.7000	.5294	-.1706	.6751
2.6	1.0599	.8200	-.2399	.5756
2.9	1.4316	1.2567	-.1749	.6685

TABLE 56

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 60, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s/E_c
.4	-1.0099	- .9800	.0299	1.0713
.6	- .7719	- .7311	.0408	1.0985
.8	- .5998	- .5667	.0331	1.0792
1.0	- .4533	- .4333	.0200	1.0471
1.3	- .2537	- .2408	.0129	1.0301
1.7	.0114	.0038	-.0076	.9827
2.0	.2347	.1908	-.0439	.9039
2.3	.5092	.4356	-.0736	.8441
2.6	.8886	.7675	-.1211	.7567
2.9		1.2525		

TABLE 57

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 61, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c	Exposure Ratio E_s / E_c
.6	-1.4774	-1.4893	-.0119	.9730
.7	-1.3657	-1.3827	-.0170	.9616
.8	-1.2814	-1.2964	-.0150	.9661
.9	-1.2098	-1.2236	-.0138	.9687
1.0	-1.1446	-1.1560	-.0114	.9741
1.1		-1.0960		
1.2	-1.0222	-1.0360	-.0138	.9687
1.4	-.9013	-.9214	-.0201	.9548
1.6	-.7743	-.8048	-.0305	.9322
1.8	-.6286	-.6839	-.0553	.8804
2.0	-.4457	-.5506	-.1049	.7854

TABLE 58

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 61, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.45703	-1.4360	.021	1.0500
.6	-1.2299	-1.2156	.0143	1.0335
.7	-1.0080	-1.0943	-.0063	.9856
.8	-.9738	-.9924	-.0186	.9581
1.0	-.7842	-.8233	-.0391	.9139
1.2	-.6283	-.6920	-.0637	.8636
1.4	-.4785	-.5720	-.0935	.8063
1.6	-.3325	-.4084	-.0759	.8397
1.8	-.1526	-.2761	-.1235	.7525
2.0	.2178	-.0994		

TABLE 59

COMPARISON OF EXPOSURE GENERATED BY VAN KRAVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 62, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.6	-1.4890	-1.4542	.0348	1.0834
.7	-1.3756	-1.3400	.0356	1.0854
.8	-1.2912	-1.2733	.0179	1.0421
.9	-1.2203	-1.2067	.0136	1.0318
1.0	-1.1565	-1.1440	.0125	1.0292
1.2	-1.0387	-1.0244	.0143	1.0334
1.4	-.9237	-.9141	.0096	1.0223
1.6	-.8020	-.7962	.0058	1.0134
1.8	-.6697	-.6740	-.0043	.9901
2.0	-.5130	-.5500	-.0370	.9183

TABLE 60

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 62, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s / E _c
.5	-1.4723	-1.4200	.0523	1.1280
.6	-1.2540	-1.2156	.0384	1.0924
.7	-1.1115	-1.0942	.0173	1.0406
.8	-.9979	-.9963	.0016	1.0037
1.0	-.8141	-.8336	-.0196	.9561
1.2	-.6639	-.6913	-.0274	.9389
1.4	-.5235	-.5663	-.0428	.9061
1.6	-.3743	-.4333	-.0590	.8730
1.8	-.2166	-.2929	-.0763	.8389
2.0	-.0029	-.1182	-.1153	.7668

TABLE 61 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 65, Pre-mission Sensitometry

Density	Log Exposure (Calculated)	Log Exposure *	Log E_s - Log E_c Log Ergs/cm ²	Exposure Ratio
	Log E_c Log Erg/cm ²	Log E_s Log Ergs/cm ²		
.4	-.8824			
.6	-.5735			
.8	-.5160			
1.0	-.3885			
1.3	-.2181			
1.7	.0192			
2.0	.2235			
2.3	.4649			
2.6	.7838			
2.9	1.2935			

* Broadband Sensitometry is fogged.

TABLE 62 . COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022
Roll: 65, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-1.1432	-1.0300	.1132	1.2978
.6	-.9093	-.7947	.1146	1.3020
.8	-.7463	-.6300	.1163	1.3071
1.0	-.5941	-.4946	.0995	1.2575
1.3	-.3997	-.3130	.0867	1.2210
1.7	-.1463	-.0800	.0663	1.1649
2.0	.0626	.1078	.0452	1.1097
2.3	.3239	.3317	.0078	1.0181
2.6	.6653	.6375	-.0278	.9380
2.9	1.1903	1.1171	-.0732	.8449

TABLE 63 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 66, Pre-Mission Sensitometry

D Density	Log Exposure (Calculated) Ergs/cm ²	Log Exposure (Sensitometry) Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.40	-.8710	-.8564	.0146	1.0342
.60	-.6419	-.6200	.0219	1.0517
.80	-.4710	-.4581	.0129	1.0301
1.00	-.3312	-.3277	.0035	1.0081
1.30	-.1458	-.1431	.0027	1.0062
1.70	.1020	.0992	-.0028	1.9936
2.00	.3063	.2900	-.0163	.9632
2.30	.5524	.4986	-.0538	.8835
2.60	.8746	.7871	-.0875	.8175
2.90	1.3213	1.1963	-.1250	.7499

TABLE 64,

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY

Film: SO-022

Roll: 66, Post-Mission Sensitometry

D Density	Log Exposure (Calculated) Ergs/cm ²	Log Exposure (Sensitometry) Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s /E _c
.40	-1.1704	-1.1189	.0515	1.1259
.60	- .9272	- .8700	.0572	1.1408
.80	- .7487	- .7033	.0454	1.1102
1.00	- .5954	- .5700	.0254	1.0602
1.30	- .4028	- .3715	.0310	1.0740
1.70	- .1561	- .1356	.0205	1.0483
2.00	.0485	.0480	-.0005	.9988
2.30	.3062	.2753	-.0309	.9313
2.60	.6358	.5875	-.0483	.8947
2.90	1.1631	1.0529	-.1102	.7759

TABLE 65

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 67, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s / E _c
.6	-1.4573	-1.1693	.2880	1.9409
.7	-1.3540	-1.0621	.2919	1.9584
.8	-1.2736	-.9791	.2945	1.9702
.9	-1.2043	-.9064	.2979	1.9856
1.0	-1.1411	-.8404	.3007	1.9985
1.2	-1.0229	-.7219	.3010	1.9999
1.4	-.9063	-.6169	.2894	1.9472
1.6	-.7808	-.5046	.2962	1.8889
1.8	-.6415	-.3804	.2611	1.8243
2.0	-.4720	-.2500	.2220	1.6672

TABLE 66

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 67, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.39243	-1.4200	-.0276	.9384
.6	-1.1992	-1.2000	-.0008	.9982
.7	-1.0644	-1.0762	-.0118	.9732
.8	-.95272	-.9795	-.0268	.9402
1.0	-.7646	-.8213	-.0567	.8776
1.2	-.6072	-.6850	-.0778	.8360
1.4	-.4664	-.5600	-.0936	.8061
1.6	-.3222	-.4320	-.1098	.7766
1.8	-.1683	-.2977	.1294	.7423
2.0	.1309	-.1200	-.2509	.5612

TABLE 67

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 68, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) $\text{Log } E_c$ Ergs/cm^2	Log Exposure (Sensitometry) $\text{Log } E_s$ Ergs/cm^2	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm^2	Exposure Ratio E_s / E_c
.5		-1.3200		
.6	-1.4310	-1.1550	.2760	1.8880
.7	-1.3309	-1.0300	.3009	1.9994
.8	-1.2508	-.9573	.2935	1.9656
.9	-1.1807	-.8845	.2962	1.9779
1.0	-1.1165	-.8226	.2939	1.9674
1.2	-.9963	-.7050	.2913	1.9557
1.4	-.8776	-.6050	.2726	1.8733
1.6	-.7509	-.4993	.2516	1.7848
1.8	-.6022	-.3870	.2152	1.6413
2.0	-.4235	-.2565	.1670	1.4689

TABLE 68

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 68, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4		-2.46		
.5	-1.3631	-1.3857	-.0226	.9493
.6	-1.1759	-1.1978	-.0219	.9500
.7	-1.0407	-1.0762	-.0355	.9415
.8	-.9294	-.9767	-.0473	.8968
.9		-.8878		
1.0	-.7494	-.8167	-.0673	.8564
1.2	-.6023	-.6860	-.0837	.8247
1.4	-.4647	-.5660	-.1013	.7920
1.6	-.3179	-.4384	-.1205	.7577
1.8	-.1584	-.3045	-.1461	.7143
2.0	.1684	-.1220	-.2904	.5124

TABLE 69

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 71, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-.8490	-.8331	.0159	1.0372
.5		-.7100		
.6	-.6322	-.6211	.0111	1.0259
.8	-.4755	-.4665	.0090	1.0209
1.0	-.3459	-.3367	.0092	1.0214
1.3	-.1724	-.1580	.0144	1.0337
1.7	.0651	.0800	.0149	1.0349
2.0	.2683	.2726	.0043	1.0100
2.3	.5066	.4860	-.0206	.9537
2.6	.8110	.7800	-.0310	.9311
2.9	1.2885	1.1814	-.1071	.7814

TABLE 70

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 71, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-1.1368	-1.0167	.1201	1.3186
.6	-.8975	-.7853	.1122	1.2948
.8	-.7194	-.6227	.0967	1.2494
.9		-.5500		
1.0	-.5733	-.4885	.0848	1.2156
1.3	-.3872	-.3038	.0834	1.2117
1.7	-.1451	-.0738	.0713	1.1784
2.0	.0554	.1148	.0594	1.1466
2.3	.3151	.3525	.0374	1.0899
2.6	.6348	.6423	.0075	1.0174
2.9	1.1434	1.1225	-.0209	.9530

TABLE 71

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 72, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio $E_s - E_c$
.3		-1.0600		
.4	-.8462	-.8564	-.0102	.9768
.6	-.5981	-.6200	-.0219	.9508
.8	-.4270	-.4581	-.0311	.9309
1.0	-.2874	-.3277	-.0403	.9114
1.3	-.0943	-.1474	-.0531	.8849
1.7	.1687	.0869	-.0818	.8283
1.9		.2100		
2.0	.3665	.2796	-.0869	.8187
2.3	.5919	.4914	-.1005	.7934
2.6	.9071	.7764	-.1307	.7401
2.9	1.3653	1.1900	-.1753	.6679

TABLE 72

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 72, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio $E_s - E_c$
.4	-1.1726	-1.0280	.0846	1.2151
.6	-.8329	-.7629	.0700	1.1749
.8	-.6555	-.5884	.0671	1.1671
1.0	-.5098	-.4478	.0620	1.1535
1.3	-.3146	-.2538	.0608	1.1503
1.7	-.0598	-.0167	.0431	1.1043
2.0	.1482	.1652	.0170	1.0499
2.3	.3926	.3965	.0039	1.0090
2.6	.7168	.6936	-.0232	.9480
2.9	1.2360	1.1614	-.0746	.8422

TABLE 73

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 73, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5		-1.3933		
.6	-1.4629	-1.1978	.2651	1.8412
.7	-1.3510	-1.0762	.2748	1.8828
.8	-1.2657	-.9795	.2862	1.9329
.9	-1.1932	-.8953	.2979	1.9856
1.0	-1.1279	-.8213	.3066	2.0258
1.2	-1.0089	-.6860	.3229	2.1033
1.4	-.8931	-.5660	.3271	2.1237
1.6	-.7718	-.4278	.3440	2.208
1.8	-.6308	-.2857	.3451	2.2136
2.0	-.4626	-.1088	.3538	2.2584

TABLE 74

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 73, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.4349	-1.0227	.4122	2.5834
.6	-1.2334	-.9718	.2616	1.8264
.7	-1.0971	-.8773	.2198	1.6588
.8	-.9851	-.8203	.1648	1.4615
.9		-.7652		
1.0	-.8008	-.7100	.0908	1.2325
1.2	-.6497	-.6100	.0397	1.0957
1.3		-.5600		
1.4	-.5072	-.5067	.0005	1.0012
1.6	-.3534	-.4000	-.0466	.8983
1.8	-.1858	-.2696	-.0838	.8245
2.0	.0877	-.1140	-.2017	.6285

TABLE 75

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 74, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.6	-1.4684	-1.1300	.3384	2.1797
.7	-1.3554	-1.0148	.3406	2.1908
.8	-1.2707	-.9386	.3321	2.1483
.9	-1.1990	-.8636	.3354	2.1647
1.0	-1.1341	-.7996	.3345	2.1602
1.2	-1.0140	-.6800	.3340	2.1577
1.4	-.8972	-.5800	.3172	2.0759
1.6	-.7731	-.4576	.3155	2.0678
1.8	-.6364	-.3340	.3024	2.0063
2.0	-.4722	-.1935	.2787	1.8998

TABLE 76 . COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424
Roll: 74, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4		-2.1300		
.5	-1.5070	-1.3400	.1670	1.4689
.6	-1.2664	-1.1586	.1078	1.2817
.7	-1.1170	-1.0514	.0656	1.1631
.8	-.9976	-.9547	.0429	1.1038
.9		-.8633		
1.0	-.8076	-.7967	.0109	1.0254
1.2	-.6565	-.6680	-.0115	.9739
1.4	-.5167	-.5461	-.0294	.9345
1.6	-.3690	-.4070	-.0380	.9162
1.8	-.2121	-.2761	-.0640	.8630
2.0	.0044	-.0900	-.0856	.8211

TABLE 77

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 77, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s - E _c
.3		-1.03		
.4	- .8542	- .8300	.0242	1.0573
.6	- .6342	- .6174	.0168	1.0394
.8	- .4705	- .4700	.0005	1.0012
1.0	- .3399	- .3408	-.0009	.9979
1.3	- .1643	- .1550	.0093	1.0216
1.7	.0771	.0800	.0029	1.0067
2.0	- .2843	.2726	-.0117	.9734
2.3	.5304	.5029	-.0275	.9386
2.6	.8782	.7985	-.0797	.8323
2.9	1.4227	1.2100	-.2127	.6128

TABLE 78 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022
Roll: 77, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio $E_s - E_c$
.4	-1.1333	-1.0033	.1300	1.3490
.5		-.8700		
.6	-.8959	-.7500	.1459	1.3992
.8	-.7202	-.6082	.1120	1.2942
1.0	-.5699	-.4732	.0967	1.2494
1.3	-.3767	-.2893	.0874	1.2229
1.4		-.2300		
1.7	-.1245	-.0062	.1183	1.3131
2.0	.0844	.1357	.0513	1.1254
2.3	.3479	.3650	.0171	1.0402
2.6	.7042	.6885	-.0157	.9645
2.9	1.3175	1.2100	-.1075	.7807

TABLE 79

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 78, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	.7583	.8273	-.0690	.8531
.6	.5370	.6000	-.0630	.8650
.8	.3736	.4429	-.0693	.8525
1.0	.2327	.3154	-.0827	.8266
1.3	.0366	.1308	-.0942	.8050
1.7	.2208	.1300	-.0908	.8113
2.0	.4248	.3124	-.1124	.7720
2.3	.6800	.5388	-.1412	.7224
2.6	1.0401	.8300	-.2101	.6165
2.9	1.4317	1.2600	-.1717	.6734

TABLE 80

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 78, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-1.0526	- .9711	.0815	1.2064
.6	- .8000	- .7222	.0778	1.1962
.8	- .6107	- .5522	.0585	1.1442
1.0	- .4613	- .4138	.0475	1.1156
1.3	- .2704	- .2304	.0400	1.0965
1.7	- .0068	.0080	.0148	1.0347
2.0	.2193	.2033	-.0160	.9638
2.3	.4888	.4450	-.0438	.9041
2.6	.8751	.7755	-.0996	.7951
2.9	1.3562	1.2686	-.0876	.8173

TABLE 81

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 1A, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s / E _c
.5		-1.4467		
.6	-1.5107	-1.1800	.3307	2.1414
.7	-1.3769	-1.0550	.3219	2.0984
.8	-1.2824	-.9690	.3134	2.0578
.9	-1.2036	-.8929	.3107	2.0450
1.0	-1.1328	-.8252	.3076	2.0305
1.2	-1.0026	-.6997	.3029	2.0086
1.4	-.8773	-.5962	.2811	1.9102
1.6	-.7454	-.4768	.2686	1.8561
1.8	-.6007	-.3478	.2529	1.7902
2.0	-.4186	-.2029	.2157	1.6432

TABLE 82 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 1A, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.5697	-1.6600	-.0903	.8123
.6	-1.2882	-1.2867	.0015	1.0035
.7	-1.1357	-1.1371	-.0014	.9968
.8	-1.0192	-1.0300	-.0108	.9754
.9		-.9458		
1.0	-.8346	-.8630	-.0284	.9367
1.2	-.6778	-.7239	-.0461	.8993
1.4	-.5326	-.6020	-.0694	.8523
1.6	-.3788	-.4655	-.0867	.8190
1.8	-.2158	-.3175	-.1017	.7912
2.0	.0025	-.1146	-.1171	.7637

TABLE 83

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 2A, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s / E _c
.5		-1.4600		
.6	-1.5028	-1.2000	.3028	2.0082
.7	-1.3695	-1.0675	.3020	2.0045
.8	-1.2755	-.9767	.2988	1.9898
.9	-1.1977	-.9005	.2972	1.9824
1.0	-1.1282	-.8316	.2966	1.9797
1.2	-1.0013	-.7046	.2967	1.9802
1.4	-.8787	-.5975	.2812	1.9107
1.6	-.7479	-.4830	.2649	1.8403
1.8	-.6027	-.3591	.2436	1.7523
2.0	-.4260	-.2144	.2116	1.6278

TABLE 84

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 2A, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.7172	-1.6067	.1105	1.2897
.6	-1.3268	-1.2867	.0401	1.0967
.7	-1.1588	-1.1527	.0061	1.0141
.8	-1.0351	-1.0845	-.0494	.8925
.9		-.8700		
1.0	-.8365	-.8215	.0150	1.0351
1.2	-.6769	-.7245	-.0476	.8962
1.4	-.5257	-.6080	-.0823	.8274
1.6	-.3749	-.4765	-.1016	.7914
1.8	-.2200	-.3325	-.1125	.7718
2.0	-.0100	-.1540	-.1440	.7178

TABLE 85

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 5A, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-.8690	-.8577	.0113	1.0264
.6	-.6307	-.6347	-.0040	.9908
.8	-.4856	-.4767	.0089	1.0207
1.0	-.3556	-.3500	.0056	1.0130
1.3	-.1822	-.1760	.0062	1.0143
1.7	.0587	.0622	-.0035	.9920
2.0	.2694	.2605	-.0089	.9797
2.3	.5161	.4780	-.0381	.9160
2.6	.8481	.7738	-.0743	.8428
2.9	1.3367	1.2163	-.1204	.7579

TABLE 86

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 5A, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-1.1154	-1.0154	.1000	1.2589
.5		-.8700		
.6	-.8804	-.7700	.1104	1.2894
.8	-.7059	-.6033	.1026	1.2665
1.0	-.5511	-.4701	.0811	1.2054
1.3	-.3551	-.2854	.0697	1.1741
1.7	-.1095	.0030	.1125	1.2957
2.0	.0947	.1309	.0362	1.0869
2.3	.3510	.3525	.0015	1.0035
2.6	.6952	.6538	-.0414	.9091
2.9	1.2672	1.16	-.1072	.7813

TABLE 87

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 6A, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) $\text{Log } E_c$ Ergs/cm^2	Log Exposure (Sensitometry) $\text{Log } E_s$ Ergs/cm^2	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm^2	Exposure Ratio $E_s - E_c$
.3		-1.0600		
.4	-.8016	-.8680	-.0664	.8582
.6	-.5694	-.6271	-.0577	.8756
.8	-.4051	-.4709	-.0658	.8594
1.0	-.2674	-.3400	-.0726	.8461
1.3	-.0762	-.1554	-.0792	.8333
1.7	.1814	.0833	-.0981	.7978
2.0	.3868	.2833	-.1035	.7880
2.3	.6286	.4975	-.1311	.7394
2.6	.9589	.7800	-.1789	.6624
2.9	1.4107	1.2066	-.2041	.6250

TABLE 88

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 6A, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E _c Ergs/cm ²	Log Exposure (Sensitometry) Log E _s Ergs/cm ²	Log E _s - Log E _c Ergs/cm ²	Exposure Ratio E _s - E _c
.3		- .9000		
.4	-1.10127	- .6964	.4049	2.5404
.6	- .8326	- .4733	.3593	2.2872
.8	- .6364	- .3267	.3097	2.0403
.9		- .2600		
1.0	- .4813	- .2007	.2806	1.9081
1.3	- .2874	- .0188	.2686	1.8561
1.7	- .0353	.2300	.2653	1.8420
2.0	.1797	.4314	.2517	1.7853
2.3	.4479	.6560	.2081	1.6147
2.6	.7977	.9671	.1694	1.4771
2.9	1.3264	1.4213	.0949	1.2442

TABLE 89

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 1B, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5		-2.1300		
.6	-1.5427	-1.5533	-.0106	.9759
.7	-1.3986	-1.4086	-.0100	.9772
.8	-1.2997	-1.3044	-.0047	.9892
.9	-1.2195	-1.2156	.0039	1.0090
1.0	-1.1484	-1.1390	.0094	1.0219
1.2	-1.0188	-1.0087	.0101	1.0235
1.4	-.8936	-.9020	-.0084	.9808
1.6	-.7610	-.7804	-.0194	.9563
1.8	-.6129	-.6513	-.0384	.9154
2.0	-.4265	-.5035	-.0770	.8375

TABLE 90

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S LAW
AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 1B, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.7981	-1.8200	-.0219	.9508
.6	-1.4495	-1.3933	+.0562	1.1382
.7	-1.2725	-1.2236	+.0489	1.1192
.8	-1.1412	-1.1144	+.0268	1.0637
.9		-1.0230		
1.0	-.9336	-.9535	-.0199	.9552
1.2	-.7639	-.8167	-.0528	.8855
1.4	-.6058	-.6814	-.0756	.8402
1.6	-.4384	-.5360	-.0976	.7987
1.8	-.2584	-.3775	-.1191	.7602
2.0	-.0180	-.2157	-.1977	.6343

TABLE 91 COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 4B, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) $\text{Log } E_c$ Ergs/cm ²	Log Exposure (Sensitometry) $\text{Log } E_s$ Ergs/cm ²	$\text{Log } E_s - \text{Log } E_c$ Ergs/cm ²	Exposure Ratio E_s / E_c
.5		-1.7000		
.6	-1.5001	-1.4631	.0370	1.0889
.7	-1.3659	-1.3400	.0259	1.0615
.8	-1.2711	-1.2600	.0111	1.0259
.9	-1.1927	-1.1800	.0127	1.0297
1.0	-1.1229	-1.1200	.0029	1.0067
1.2	-.9959	-1.0014	-.0055	.9874
1.4	-.8740	-.8871	-.0131	.9703
1.6	-.7442	-.7729	-.0287	.9361
1.8	-.5990	-.6513	-.0523	.8865
2.0	-.4224	-.5035	-.0811	.8297

TABLE : 92

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: 2424

Roll: 2B, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.5	-1.6507	-1.5533	.0974	1.2514
.6	-1.3213	-1.2867	.0346	1.0829
.7	-1.1542	-1.1371	.0171	1.0402
.8	-1.0322	-1.0300	.0022	1.0051
.9		-.9500		
1.0	-.8453	-.8700	-.0247	.9447
1.2	-.6890	-.7367	-.0477	.8960
1.4	-.5450	-.6057	-.0607	.8696
1.6	-.3937	-.4696	-.0759	.8397
1.7		-.4000		
1.8	-.2363	-.3167	-.0804	.8310
2.0	-.0273	-.2348	-.2075	.6202

TABLE 93

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 5B, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) $\log E_c$ Ergs/cm ²	Log Exposure (Sensitometry) $\log E_s$ Ergs/cm ²	$\log E_s - \log E_c$ Ergs/cm ²	Exposure Ratio E_s / E_c
.3		-1.0300		
.4	-.8544	-.8264	.0280	1.0666
.6	-.6260	-.6033	.0227	1.0537
.8	-.4621	-.4567	.0054	1.0125
.9		-.3900		
1.0	-.3320	-.3307	.0013	1.0030
1.3	-.1568	-.1488	.0080	1.0186
1.7	.0881	.1000	.0119	1.0278
2.0	.2971	.3014	.0043	1.0100
2.3	.5456	.5260	.0196	1.0462
2.6	.9038	.8371	.0667	1.1660
2.9		1.2913		

TABLE 94

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 5B, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.4	-1.1275	- .9864	.1411	1.3839
.6	- .8784	- .7500	.1284	1.3440
.8	- .6994	- .5820	.1174	1.3104
1.0	- .5486	- .4476	.101	1.2618
1.3	- .3579	- .2656	.0923	1.2368
1.7	- .1101	- .0308	.1409	1.3832
2.0	.1028	.1635	.0607	1.1500
2.3	.3705	.4000	.0295	1.0703
2.6	.7356	.7291	-.0065	.9851
2.9	1.3386	1.2457	-.0929	.8074

TABLE 95

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 6B, Pre-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio E_s / E_c
.3		-1.06		
.4	- .7730	- .8418	-.0688	.8535
.6	- .5514	- .6013	-.0499	.8915
.8	- .3896	- .4360	-.0464	.8987
1.0	- .2493	- .3133	-.0640	.8630
1.3	- .0585	- .1308	-.0723	.8466
1.7	.1886	.1357	-.0529	.8853
2.0	.3963	.3233	-.0730	.8453
2.3	.6519	.5600	-.0919	.8093
2.6	1.0011	.8567	-.1444	.7171
2.9	1.4303	1.2900	-.1403	.7239

TABLE 96

COMPARISON OF EXPOSURE GENERATED BY VAN KREVALD'S
LAW AND BROADBAND SENSITOMETRY.

Film: SO-022

Roll: 6B, Post-Mission Sensitometry

Density	Log Exposure (Calculated) Log E_c Ergs/cm ²	Log Exposure (Sensitometry) Log E_s Ergs/cm ²	Log E_s - Log E_c Ergs/cm ²	Exposure Ratio $E_s - E_c$
.3		-1.2200		
.4	-1.0423	- .9600	.0823	1.2086
.6	- .7906	- .7133	.0773	1.1948
.8	- .6092	- .5436	.0656	1.1631
1.0	- .4604	- .4015	.0589	1.1452
1.3	- .2648	- .2185	.0463	1.1125
1.5		- .1000		
1.7	- .0068	.0250	.0318	1.0760
2.0	.2087	.2245	.0158	1.0371
2.3	.46766	.4638	-.0039	.9911
2.6	.8124	.7925	-.0199	.9552
2.9	1.3510	1.2713	-.0797	.8323

Density	LC1		LC2		LC3		LC4, LC5	
	Roll 01	Roll 01	Roll 25	Roll 25	Roll 31	Roll 31	Roll 55	Roll 55
	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$	$\left[\text{Log} \frac{\text{ergs}}{\text{cm}^2 \text{-ster}} \right]$
	Pre-	Post-	Pre-	post-	Pre-	Post-	Pre-	Post-
.3	.942	1.112	.970	-	-	-	-	-
.4	1.135	1.316	.972	1.001	.898	-	-	-
.5	-	-	1.182	1.224	1.124	-	-	1.260
.6	1.338	1.552	1.298	1.396	1.250	-	1.212	1.454
.7	-	-	-	-	-	-	1.318	1.590
.8	1.484	1.715	1.453	1.602	1.316	-	1.397	1.701
.9	-	-	-	-	-	-	1.465	-
1.0	1.608	1.858	1.578	1.752	1.542	-	1.526	1.880
1.2	1.728	2.002	1.695	1.880	1.658	-	1.642	2.026
1.4	1.855	2.154	1.813	1.999	1.772	-	1.758	2.164
1.6	1.992	2.313	1.937	2.127	1.894	-	1.880	2.304
1.8	2.144	2.492	2.075	2.276	2.030	-	2.024	2.459
2.0	2.606	2.731	2.242	2.475	2.197	-	2.199	2.663

TABLE 97 - Energy Density/ster required to produce a photographic density, station 1, (690-880 nm)

Using the Whole Moon as a Standard

Density	LC1		LC 2		LC 3		LC4, LC 5	
	Roll 02	Roll 02	Roll 26	Roll 26	Roll 32	Roll 32	Roll 56	Roll 56
	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$	$\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2 \cdot \text{ster}} \right]$
	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
.3	.830	1.325	-	-	-	-	-	-
.4	1.060	1.539	.920	1.013	.646	-	-	-
.5	-	-	1.149	1.298	9.29	1.288	-	1.386
.6	1.321	1.776	1.274	1.449	1.067	1.382	1.266	1.560
.7	-	-	-	-	-	1.503	1.371	1.689
.8	1.488	1.951	1.442	1.760	1.251	1.605	1.453	1.796
1.0	1.627	2.099	1.575	1.818	1.384	1.764	1.589	1.975
1.2	1.857	2.242	1.701	1.948	1.499	1.898	1.709	2.124
1.4	1.893	2.396	1.828	2.072	1.614	2.022	1.832	2.367
1.6	2.033	2.549	1.969	2.207	1.740	2.150	1.958	2.433
1.8	2.185	2.755	2.117	2.370	1.874	2.194	2.099	2.602
2.0	2.3076	3.325	2.295	2.604	2.056	2.583	2.173	2.764

TABLE 98 ENERGY-DENSITY/STER Required to Produce a Photographic Density, Station 2 (750-900 nm)

	LC1		LC2		LC3		LC4, LC5	
Density	Roll 05 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 05 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 29 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 29 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 35 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 35 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 59 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$	Roll 59 $\text{Log} \left[\frac{\text{ergs}}{\text{cm}^2\text{-ster}} \right]$
	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
.3	1.008	8.43	1.015	-	1.111	-	-	-
.4	1.207	1.069	1.225	1.005	1.328	1.112	1.330	1.058
.5	-	-	-	1.141	-	1.252	-	-
.6	1.442	1.299	1.446	1.244	1.560	1.355	1.548	1.299
.8	1.592	1.457	1.701	1.409	1.720	1.540	1.701	1.480
1.0	1.716	1.588	1.725	1.548	1.853	1.567	1.840	1.628
1.2	-	-	1.861	1.678	1.974	1.788	-	-
1.25	1.867	1.746	-	-	-	-	-	-
1.3	-	-	-	-	-	-	2.015	1.817
1.4	-	-	1.983	1.803	2.092	1.909	-	-
1.5	2.027	1.915	-	-	-	-	-	-
1.6	-	-	2.104	1.928	2.209	2.030	-	-
1.7	-	-	-	-	-	-	2.255	2.070
1.75	2.193	2.065	-	-	-	-	-	-
1.8	-	-	2.231	2.054	2.331	2.151	-	-
2.0	2.351	2.228	2.369	2.188	2.465	2.280	2.459	2.281
2.25	2.521	2.408	-	-	-	-	-	-
2.3	-	-	-	-	-	-	2.696	2.458
2.6	-	-	-	-	-	-	3.022	-

TABLE 99 - Energy Density/ster (ergs/cm²-ster) required to produce a photographic density, Station 5 (550-720 nm) using the whole moon as an irradiant.

Density	LC1		LC2		LC3		LC4, LC5	
	Roll 06	Roll 06	Roll 30	Roll 30	Roll 36	Roll 36	Roll 60	Roll 60
	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$	Log $\frac{\text{ergs}}{\text{cm}^2\text{-ster}}$
	Pre-	Post-	Post-	Pre-	Post-	Pre-	Post-	Post-
.3	.859	.639	.858	.629	.907	-	-	-
.4	1.055	.880	1.065	.849	1.1267	.918	1.241	.988
.5	-	-	-	-	-	1.057	-	-
.6	1.290	1.119	1.296	1.092	1.360	1.162	1.463	1.221
.8	1.445	1.284	1.467	1.264	1.527	1.336	1.634	1.398
1.0	1.574	1.428	1.573	1.414	1.667	1.486	1.775	1.550
1.2	-	-	1.732	1.552	1.795	1.623	-	-
1.25	1.728	1.595	-	-	-	-	-	-
1.3	-	-	-	-	-	-	1.963	1.753
1.4	-	-	1.857	1.682	1.924	1.751	-	-
1.5	1.888	1.756	-	-	-	-	-	-
1.6	-	-	1.984	1.810	2.043	1.878	-	-
1.7	-	-	-	-	-	-	2.218	2.020
1.75	2.055	1.919	-	-	-	-	-	-
1.8	-	-	2.104	1.942	2.174	2.009	-	-
2.0	2.219	2.086	2.263	2.087	2.317	2.303	2.432	2.244
2.25	2.628	2.265	-	-	-	-	-	-
2.3	-	-	-	-	-	-	2.691	2.244
2.6	-	-	-	-	-	-	3.040	2.909
2.9	-	-	-	-	-	-	3.550	-

TABLE 100 - Energy Density/ster (ergs/cm²-ster) required to produce a photographic density, Station 6, (450-650 nm) using the whole moon as an irradiant.

	Lunar Radiance $\frac{N}{w/cm^2}$ -ster	$\text{Log(Nt)} \text{ Log} \left(\frac{\text{ergs}}{cm^2 \text{-Ster}} \right)$	Density	$\text{Log(Nt)} \text{ Pre-}$ Estimate	$\text{Log(Nt)} \text{ Post-}$ Estimate	Ratio Pre-	Ratio Post-
Lunar Cal 1							
01,351-353 369-371	9.1×10^{-4}	1.296	.45	1.186	1.374	1.288	.836
01,354-356 373-375	"	1.597	.85	1.546	1.751	1.125	.701
01,357-359 376-378	"	1.898	1.40	1.855	2.153	1.104	.556
Lunar Cal 2							
25,280-282	8.57×10^{-4}	1.269	-	-	-	-	-
25,283-285	"	1.570	.91	1.521	1.883	1.119	.486
25,286-288	"	1.871	1.41	1.819	2.006	1.127	.733
Lunar Cal 3							
31,331-330	9.26×10^{-4}	1.303	.63	1.275	-	1.067	-
31,331-332	"	1.624	1.00	1.541	-	1.211	-
31,333-334	" 1.9	1.925	1.43	1.790	-	1.365	-
Lunar Cal 4							
55,10-12	9.40×10^{-4}	1.912	1.27	1.683	2.074	1.694	.687
44,13-15	"	1.611	.79	1.390	1.690	1.663	.834
55,16-18	"	1.310	.62	1.234	1.480	1.191	.676
Lunar Cal 5							
55,339-401	9.71×10^{-4}	1.935	1.27	1.683	2.074	1.786	.726
55,402-404	"	1.634	.74	1.351	1.612	1.919	1.052

TABLE 101 - RADIANCE ERROR ESTIMATES, WHOLE MOON, STATION 1 (690-880 nm)

	Lunar Radiance $\frac{N_2}{W/cm^2-ster}$	Log(Nt) $Log(\frac{ergs}{cm^2-ster})$	Density	Log(Nt) Pre- Estimate	Log(Nt) Post- Estimate	Ratio Pre-	Ratio Post-
Lunar Cal 1							
02,351-353 369-371	6.79×10^{-4}	1.168	.34	.921	1.411	1.766	.571
02,354-356 372-374	"	1.471	.60	1.321	1.776	1.413	.495
02,357-359 375-377	"	1.771	1.07	1.672	2.149	1.256	.419
Lunar Cal 2							
26,280-282	6.39×10^{-4}	1.142	-	-	-	-	-
26,283-285	"	1.443	.62	1.291	1.470	1.419	.930
26,286-288	"	1.744	.98	1.562	1.802	1.521	.875
Lunar Cal 3							
32,329-330	6.91×10^{-4}	1.176	.51	.942	1.207	1.714	.931
32,331-332	"	1.477	.85	1.285	1.644	1.556	.681
32,333-334	"	1.778	1.22	1.511	1.910	1.849	.738
Lunar Cal 4							
56,10-12	7.01×10^{-4}	1.784	1.12	1.661	2.064	1.327	.525
56,13-15	"	1.483	1.827	1.467	1.814	1.038	.467
56,16-18	"	1.182	.60	1.266	1.560	.824	.419
Lunar Cal 5							
56,399-401	7.24×10^{-4}	1.798	1.34	1.795	2.224	1.007	3.750
56,402-404	"	1.497	.82	1.466	1.814	1.074	.482
56,405-407	"	1.196	.66	1.330	1.637	.735	.362

TABLE 102 - RADIANCE ERROR ESTIMATES, WHOLE MOON, STATION 2 (750-900 nm)

Lunar Radiance		Log(Nt)	Density	Log(Nt) Pre- Estimate	Log(Nt) Post- Estimate	Ratio Pre-	Ratio Post-
W/cm^2	N -ster	Log ($\frac{ergs}{cm^2-ster}$)					
Lunar Cal 1							
05,351-353 369-371	9.5×10^{-4}	1.314	.74	1.446	1.109	.738	1.603
05,354-356 372-374	"	1.615	1.18	1.623	1.445	.982	1.479
05,356-358 375-377	"	1.916	1.68	1.845	1.722	.684	1.563
Lunar Cal 2							
29,280-282	8.95×10^{-4}	1.288	.52	1.358	1.162	.851	1.337
29,283-285	"	1.589	.93	1.674	1.491	.822	1.103
29,286-288	"	1.890	1.43	2.001	1.822	.774	1.169
Lunar Cal 3							
35,329-330	9.68×10^{-4}	1.322	.71	1.530	1.333	.619	.975
35,331-333	"	1.623	1.861	1.861	1.571	.571	1.127
35,333-334	"	1.924	1.57	2.086	1.908	.689	1.038
Lunar Cal 4							
59,10-12	9.81×10^{-4}	1.930	1.19	1.998	1.795	.855	1.364
59,13-15	"	1.609	.69	1.662	1.381	.885	1.690
59,16018	"	1.328	.43	1.412	1.142	.824	1.535
Lunar Cal 5							
59,399-401	1.01×10^{-3}	1.949	1.22	2.016	1.815	.857	1.361
59,402-404	"	1.648	.75	1.738	1.483	.813	1.462

TABLE 103 Camera Station 5 Radiance Error estimates, whole moon, (550-720 nm)

	Lunar Radiance $\frac{N}{W/cm^2}$ -Ster	Log(NT)	Density	Pre- Estimate Log(Nt)	Post- Estimate Log(Nt)	Pre- Ratio	Post- Ratio
Lunar Cal 1							
06,351-353 369-371	1.05×10^{-3}	1.364	.62	1.406	1.136	.908	1.690
354-356 372372-374	"	1.665	1.02	1.686	1.441	.953	1.675
357-359 373-375	"	1.966	1.53	2.008	1.776	.908	1.549
Lunar Cal 2							
30,280-282	9.85×10^{-4}	1.336	.58	1.373	1.068	.964	1.854
283-285	"	1.637	1.12	1.668	1.497	.969	1.302
286-288	"	1.938	1.70	2.044	1.876	.899	1.064
Lunar Cal 3							
36,329-330	1.06×10^{-3}	1.365	.71	1.452	1.258	.818	1.279
331-332	"	1.666	1.00	1.667	1.486	.998	1.513
333-334	"	1.967	1.34	1.885	1.713	1.208	1.795
Lunar Cal 4							
60,10-12	1.08×10^{-3}	1.978	1.38	2.014	1.806	.920	1.486
13-15		1.677	.88	1.690	1.459	.970	1.243
16-18	"	1.376	.44	1.285	1.0346	1.233	2.218
Lunar Cal 5							
60,399-401	1.12×10^{-3}	1.989	1.25	1.992	1.719	.997	1.310
402-404	"	1.688	.88	1.690	1.459	.998	1.694

TABLE 104 - RADIANCE ERROR ESTIMATES, WHOLE MOON, STATION 6 (450-650 NM)

TABLE 105 - MARE SERENITATIS RADIANCE ESTIMATES, STATION 1 (200-910nm.)

Roll, Frame	Density	Radiance Estimate based on Pre-mission Sensitometry w/cm ² -Ster	Radiance Estimate Based on Post-mission Sensitometry w/cm ² -Ster
Lunar Cal 1			
01,351-353 369-371	.52	8.80×10^{-4}	1.30×10^{-3}
01,354-356 372-374	.90	7.99×10^{-4}	1.39×10^{-3}
01,357-359 375-377	1.36	7.68×10^{-4}	1.51×10^{-3}
Lunar Cal 3			
31,329-330	-	-	-
31,331-332	1.05	8.46×10^{-4}	-
31,333-334	1.45	7.21×10^{-4}	-
Lunar Cal 4			
55,10-12	1.28	5.55×10^{-4}	1.37×10^{-3}
55,13-15	.80	5.67×10^{-4}	1.14×10^{-3}
55,16-18	.63	7.97×10^{-4}	1.42×10^{-3}
Lunar Cal 5			
55,399-401	1.27	5.47×10^{-4}	1.35×10^{-3}
55,402-404	.74	5.08×10^{-4}	9.79×10^{-4}

TABLE 106 - MARE SERENETATIS RADIANCE ESTIMATES, STATION 2
(750-910nm.)

Roll, Frame	Density	Radiance Estimate Based on Pre-Mission Sensitometry W/cm ² - Ster	Radiance Estimate Based on Post-Mission Sensitometry W/cm ² - Ster
Lunar Cal 1			
02,351-353 369-371	.39	4.95×10^{-4}	1.50×10^{-3}
02,354-356 372-374	.63	5.04×10^{-4}	1.44×10^{-3}
02,357-359 375-377	1.09	6.11×10^{-4}	1.66×10^{-3}
Lunar Cal 3			
32,329-330	-	-	-
32,331-332	.75	3.64×10^{-4}	4.4×10^{-4}
32,333-334	1.07	3.01×10^{-4}	7.35×10^{-4}
Lunar Cal 4			
56,10-12	1.14	5.35×10^{-4}	1.364×10^{-3}
56,13-15	.84	7.31×10^{-4}	1.68×10^{-3}
56,16-18	.62	8.80×10^{-4}	1.75×10^{-3}
Lunar Cal 5			
56,399-401	1.34	7.09×10^{-4}	2.24×10^{-3}
56,402-404	.82	6.65×10^{-4}	2.20×10^{-3}

TABLE 107 - MARE SERENITATIS RADIANCE ESTIMATES, STATION 5 (550-720nm)
(550-720nm.)

Roll, Frame	Density	Radiance Estimate Based on Pre-Mission Sensitometry W/cm ² -Ster	Radiance Estimate Based on Post-Mission Sensitometry W/cm ² -Ster
Lunar Cal 1			
05,351-353 369-371	.59	9.34×10^{-4}	6.76×10^{-4}
05,354-356 372-374	1.05	1.26×10^{-3}	9.46×10^{-4}
05,357-359 375-377	1.52	1.33×10^{-3}	1.02×10^{-3}
Lunar Cal 3			
35,329-330	-	-	-
35,331-332	1.18	2.08×10^{-3}	1.33×10^{-3}
35,333-334	1.51	1.63×10^{-3}	1.07×10^{-3}
Lunar Cal 4			
59,10-12	1.22	2.11×10^{-3}	1.32×10^{-3}
59,13-15	.72	9.92×10^{-4}	5.80×10^{-4}
59,16-18	.46	1.13×10^{-3}	6.14×10^{-3}
Lunar Cal 5			
59,339-401	1.93	2.14×10^{-3}	1.40×10^{-3}
59,402-404	1.22	2.11×10^{-3}	1.32×10^{-3}

TABLE 108 - MARE SERENETATIS RADIANCE ESTIMATES, STATION 6 (450-630nm.)

Roll, Frame	Density	Radiance Estimate Based on Pre-Mission Sensitometry W/cm ² - Ster	Radiance Estimate Based on Post-Mission Sensitometry W/cm ² - Ster
Lunar Cal 1			
06,351-353 369-371	.53	7.33×10^{-4}	5.48×10^{-4}
06,354-356 372-374	.88	7.13×10^{-4}	4.99×10^{-4}
06,357-359 375-377	1.38	7.36×10^{-4}	5.25×10^{-4}
Lunar Cal 2			
36,329-330	-	-	-
36,331-332	1.00	1.06×10^{-4}	8.06×10^{-4}
36,333-334	1.26	7.72×10^{-4}	5.21×10^{-4}
Lunar Cal 4			
60,10-12	1.42	1.24×10^{-3}	7.74×10^{-4}
60,13-15	.92	1.19×10^{-3}	7.01×10^{-4}
60,16-18	.49	9.97×10^{-4}	5.63×10^{-4}
Lunar Cal 5			
60,339-401	1.23	9.43×10^{-4}	5.77×10^{-4}
60,402-404	.66	7.42×10^{-4}	4.27×10^{-4}

TABLE 109 ANOMALOUS SPECTRAL SENSITIVITY DATA POINTS

Camera Station 1

Roll	Pre-Mission	Post-Mission
1	General 2 Sigma Points	-
7	NA	-
13	NA	-
17		-
25		NA
31		NA
37		NA
43		NA
*49	All Points are more than three sigma below means	
55		-
61		-
67		-
73		-
A1		-
B1		Several 2 Sigma Points below 740 nm

Camera Station 2

2	Data below 700 nm 153 Sigma; below 750 nm, 2 Sigma	-
8	NA	-
14	Several 2 Sigma Points	-
20	Several 2 Sigma Points	-
26	-	Two Points greater than 2 Sigma
32	All points greater than 3 Sigma	-
38	NA	NA
44	NA	NA
*50	NA	NA
56	-	-
62	-	-
74	-	-
A2	-	-
B2	-	-

TABLE 109 (CONTINUED)

Camera Station 5

	Pre-Mission	Post-Mission
Roll		
**6	-	-
11	All points greater than 3 sigma	NA
17	All points greater than 3 sigma	NA
23	-	-
29	-	-
35	-	-
41	-	-
47	-	-
**53	All data points are below three sigma limit	-
59	-	-
65	-	-
71	-	-
77	-	-
A5	-	-
B5	-	-

Camera Station 6

	Pre-Mission	Post-Mission
Roll		
** 5	-	-
12	-	-
18	-	-
24	-	-
30	-	-
36	-	-
42	-	-
48	-	-
**54	NA	NA
60	-	-
66	-	-
72	-	-
78	-	-
A6	-	-
B6	-	-

* Camera filters omitted during flight

** Magazines incorrectly loaded on camera

TABLE 110

SIGNAL TO NOISE RATIO
(LARGE AREA MEASUREMENTS)

	<u>Stations</u>	<u>SNR</u>
Pre-Mission	1 and 2	33.6
	5	51.0
	6	38.6
Post-Mission	1 and 2	43.3
	5	45.6
	6	46.7

TABLE 111

Pre-Mission

	<u>Broadband Std.Dev.</u>	<u>Spectral Std. Dev.</u>	R	R Range *
	Broadband Mean	Spectral Mean		
Station 1,2	38%	7.2%	-.18	-.436-.09
5	3.46%	3.86%	.76 **	.65 - .84
6	7.26%	4.8%	-.43	-.65 - -.14

Post-Mission

Station 1,2	20.7%	21.3%	.89 **	.85 - .92
5	4.86%	4.41%	.09	-.22 - .38
6	8.51%	9.2%	-.60 **	-.76 -.36

Range is probable error (50% probability) limits of R calculated from Fisher's distribution.

* Significant Correlation

** Highly Significant Correlation

TABLE 112

Pre-Mission

	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0
.6	1	.94	.84	.75	.70	.64	.62	.55
.8		1	.94	.88	.82	.77	.75	.74
1.0			1	.98	.95	.92	.89	.85
1.2				1	.99	.97	.96	.92
1.4					1	.99	.98	.96
1.6						1	.995	.98
1.8							1	.99
2.0								1

Post-Mission

	.6	.8	1.0	1.2	1.4	1.6	1.8	2.0
.6	1	.63	.44	.47	.42	.30	.20	.09
.8		1	.97	.88	.87	.81	.74	.69
1.0			1	.98	.96	.90	.84	.78
1.2				1	.98	.94	.89	.84
1.4					1	.98	.95	.91
1.6						1	.99	.97
1.8							1	.98
2.0								1